5.15 HAZARDOUS MATERIALS HANDLING

This section discusses the potential effects from the storage and use of hazardous materials during construction and operation of the Project, its generating facility and its ancillary systems (Solar One or Project). Design features (specifically storage procedures) have been incorporated into the Project regarding the use of hazardous materials, to keep maximum potential effects below defined thresholds of significance. Hazardous waste generation and management are further discussed in Section 5.14, Waste Management.

The following discussion covers the affected environment; the environmental consequences associated with hazardous materials usage during construction and operation of the Project; cumulative effects; mitigation measures; and applicable laws, ordinances, regulations, and standards (LORS).

5.15.1 Affected Environment

The Project includes the construction, operation, maintenance, and abandonment of up to 850 megawatts (MW) of capacity by a solar power generating facility and its ancillary systems in two phases (Phase I: 500MW [approximately 5,838 acres]/Phase II 350MW [approximately 2,392 acres]). The Project will consist of up to approximately 34,000 SunCatchers. Construction is anticipated to occur over an approximate four-year period beginning in 2010 and ending in 2014. It is estimated that approximately an average of 400 construction and 180 long-term labor jobs will be required.

The Project is located in an undeveloped area of San Bernardino County, California, approximately 37 miles east of Barstow, California and north of Interstate 40 (I-40) between approximately 1,925 to 3,050 feet above mean sea level. The Project is located primarily on Bureau of Land Management (BLM) land within the Barstow Field Office. Approval of the Project Right-of-Way (ROW) Grant Application (Form 299, Applications CACA 49539 and 49537) will result in the issuance of a ROW Grant Permit for use of federal lands administered by the BLM. The Project would require a plan amendment to the 1980 California Desert Conservation Area (CDCA) Plan.

The area where the Project would be constructed is primarily open, undeveloped land within the Mojave Desert. The Cady Mountain Wilderness Study Area (WSA) is located north of the Solar One site. The Pisgah Crater, within the BLM-designated Pisgah Area of Critical Environmental Concern (ACEC), is located south and east of the Project (south of I-40 by several miles). Several underground and above ground utilities traverse the area as well.

An approved interconnection letter from California Independent Service Operator (CAISO) has been issued for the Project. The associated System Impact Study (SIS) is located in Appendix H. The SIS indicates that additional upgrades to the Southern California Edison (SCE) Lugo-Pisgah No. 2 Transmission Line and upgrades at the SCE Pisgah Substation will be required for the full build out of the 850MW Project. Supplemental studies performed by SCE and CAISO indicate that capacity is available on the existing transmission system to accommodate less than the 850MW Project.

An on-site substation (i.e., Solar One Substation [approximately 3 acres]) will be constructed to deliver the electrical power generated by the Project to the SCE Pisgah Substation. Approximately twelve to fifteen 220kV transmission line structures (90 to 110 feet tall) would be required to make the interconnection from the Solar One Substation to the SCE Pisgah Substation. All of these structures would be constructed within the Project Site.

The Project will include a centrally located Main Services Complex (14.4 acres) that includes three SunCatcher assembly buildings, administrative offices, operations control room, maintenance facilities, and a water treatment complex including a water treatment structure, raw water storage tank, demineralized water storage tank, basins, and potable water tank.

Adjacent to the Main Services Complex, a 14-acre temporary construction laydown area will be developed and an approximately 6-acre construction laydown area will be provided adjacent to the Satellite Services Complex south of the Burlington Northern Santa Fe (BNSF) railroad. Two additional construction laydown areas (26 acres each) one will be located at the south entrance off Hector Road and the other at the east entrance just north of the SCE Pisgah Substation.

Temporary construction site access would be provided off of I-40 beginning east of the SCE Pisgah Substation and would traverse approximately 3.5 miles across the Pisgah ACEC requiring an approximate 30-foot ROW. Long-term permanent access would be provided by a bridge over the BSNF railroad along Hector Road north of I-40. Equipment may be transported during construction via trucks and/or rail car (through the construction of a siding), that would be located on the north side of BNSF railroad and east of Hector Road or as authorized by BNSF.

Water would be provided via a groundwater well located on a portion of the BLM ROW north of the Main Services Complex and transported through an underground pipeline. The expected average well water consumption for the Project during construction is approximately 50 acre-feet per year. Under normal operation (inclusive of mirror cleaning, dust control, and potable water usage), water required will be approximately 36.2 acre-feet per year. Emergency water may be trucked in from local municipalities.

The Project will construct a 220kV double-circuit transmission line approximately 1 mile in length. It will run due south to the southern boundary of the Project Area at which point the line will travel due east to the SCE Lugo-Pisgah No. 2 Transmission Line where it will travel south to the SCE Pisgah Substation.

A summary of hazardous materials to be used and stored for construction of the Project is provided in Table 5.15-1, Hazardous Materials Usage and Storage During Construction. A summary of hazardous materials to be used and stored on-site for operation of the Project is provided in Table 5.15-2, Hazardous Materials Usage and Storage During Operations.

Table 5.15-1
Hazardous Materials Usage and Storage During Construction

Material	Purpose	Storage Location	Maximum Stored[1]	Storage Type
Diesel fuel	Refueling construction vehicles and equipment	Equipment Service Area	4,000 gallons	Tank
Diesel fuel	Refueling truck	Equipment Service Area/mobile	1,000 gallons	Truck
Gasoline	Refueling construction vehicles and equipment	Equipment Service Area	1,000 gallons	Tank
Gasoline	Refueling truck	Equipment Service Area/mobile	1,000 gallons	Truck
Lubricating oil	Lubricating equipment parts	Equipment Service Area	500 gallons	Tanks
Hydraulic oil	Lubricating equipment parts	Equipment Service Area	1,500 gallons	Tanks
Grease	Lubricating equipment parts	Equipment Service Area	45 gallons	Drum
Ethylene Glycol	Coolant, antifreeze	Equipment Service Area	500 gallons	Tanks
Acetylene	Welding	Equipment Service Area	500 cubic feet	Cylinders
Oxygen	Welding	Equipment Service Area	500 cubic feet	Cylinders
Cleaning chemicals/ detergents	Periodic cleaning	Equipment Service Area	150 gallons	Drums or small containers

Source: Stirling Energy Systems, Inc., 2008.
Note:
[1]All numbers are approximate.

Table 5.15-2
Hazardous Materials Usage and Storage During Operations

Chemical	Use	Storage Location/Type	State	Storage Quantity[1]
Insulating oil	Electrical equipment	Electrical equipment (contained in transformers and electrical switches)	Liquid	60,000 gallons initial fill
Lubricating oil	Stirling Engine/dish drives PCU	Equipment 150-gallon recycle tank located in Maintenance Building	Liquid	40,000 gallons initial fill with usage of 21 gallons per month
Hydrogen	PCU working fluid	k-bottles mounted on each SunCatcher, and within Stirling Engine	Gas	10 cubic feet within each SunCatcher (34,000 SunCatchers) Usage of 20,000 cubic feet per day
		k-bottles located in Hydrogen Storage area		196 cubic feet in each k-bottle (113 k-bottles)
Acetylene	Welding	Cylinders stored in maintenance buildings	Gas	1,000 cubic feet
Oxygen	Welding	Cylinders stored in maintenance buildings	Gas	1,000 cubic feet
Ethylene glycol	PCU Radiator Coolant, antifreeze	PCU radiator Maintenance Buildings	Liquid	40,000 gal initial fill with usage of 21 gallons per month
Various solvents, detergents, paints, and other cleaners	Building maintenance and equipment cleaning	Three (3) 55-gallon drums and 1-gallon containers will be stored Maintenance Buildings	Liquid	Ten (10) 55-gallon drums Commercial 1-gallon containers
Gasoline	Maintenance vehicles	5,000 gallon AST at refueling station with containment	Liquid	5,000 gallons
Diesel fuel	Firewater pump Maintenance Vehicles	Firewater skid 5,000-gallon AST refueling station with containment	Liquid	100 gallons initial fill 5,000 gallons
Sodium hypochlorite 12.5 percent solution (bleach)	Disinfectant for potable water	Water treatment structure	Liquid	4 gallons

Source: Stirling Energy Systems, Inc., 2008.

Notes:

[1]All numbers are approximate.

AST = aboveground storage tank

PCU = power conversion unit

5.15.2 Environmental Consequences

5.15.2.1 Construction Phase

Hazardous materials to be used during construction include gasoline, diesel fuel, oil, and small amounts of lubricants, cleaners, solvents, and adhesives. No feasible alternatives to these materials are available for construction vehicles and equipment. No acutely hazardous materials will be used or stored on-site during construction. No storage of hazardous materials is planned outside of the Project Site or laydown areas.

In general, construction contractors will use fuel, lubricating oils, and other hazardous materials during construction of the Project. The contractor will be responsible for ensuring that the use, storage, and handling of these materials will be in compliance with applicable federal, state, and local LORS, including licensing, personnel training, accumulation limits, reporting requirements, and recordkeeping. A Hazardous Materials Business Plan (HMBP), which outlines hazardous materials handling, storage, spill response, and reporting procedures, will be prepared before construction activities.

The following Project Site services will also be provided by separate contract or incorporated into individual construction subcontracts for the Project:

- environmental health and safety training,
- site security,
- site first aid,
- construction testing (e.g., soil, concrete),
- furnishing and servicing of sanitary facilities,
- trash collection and disposal, and
- disposal of hazardous materials and waste in accordance with local, state, and federal regulations.

Small quantities of spilled fuel oil and lubricant/grease drippings from construction equipment may occur during construction. Such materials generally have a low relative risk to human health and the environment. If a large spill should occur, the spill area will be bermed or controlled as quickly as practical to minimize the footprint of the spill. Contaminated soil materials produced during cleanup of a spill will be placed into drums for off-site disposal as a hazardous waste at a permitted hazardous waste transfer, storage, and disposal facility. If a spill or leak into the environment involves hazardous materials equal to or greater than the specific reportable quantity, federal, state, and local reporting requirements will be adhered to. In particular, the San Bernardino County Fire Department (SBCFD), Certified Unified Program Agency (CUPA) will be notified. The SBCFD will also be called in the event of a fire or injury. Contractors will be expected to implement best management practices consistent with hazardous materials storage, handling, emergency spill response, and reporting specified in the HMBP. The effects associated with the use of hazardous materials will be less than significant as a result of the Applicant implementing the above procedures.

5.15.2.2 Operation and Maintenance

The major hazardous materials to be stored and/or used at the Project Site during Solar One operations are listed in Table 5.15-2, Hazardous Materials Usage and Storage During Operations. Fire and explosion from the use and storage of hydrogen are the potential hazards associated with the storage of hazardous or acutely hazardous materials for the Project.

Fire and Explosion Risks

There are three types of hazardous highly flammable or explosive materials that will be used at the Project Site during operation and maintenance: hydrogen gas, oxygen and acetylene welding gases, and gasoline fuel for the operation of vehicles. Two other flammable materials that are difficult to ignite will also be used at the Project Site during operation and maintenance: transformer insulating oil and diesel fuels for the operation vehicles.

Hydrogen Gas

A flammable gas, hydrogen, will be used in the Power Conversion Unit (PCU) of the Stirling Cycle Engine as a working fluid. A maximum of 113 approved individual gas cylinders (k-bottles) of hydrogen may be stored at the Main Services Complex at any one time to provide for maintenance replacement and make-up consumption of hydrogen by the PCUs of the Stirling Cycle Engines. The gas will be stored in k-bottles supplied by an approved hydrogen gas supplier. The cylinders will be stored outside, near the Main Services Complex away from electrical lines and other potential ignition sources, as required by the applicable LORS. Cylinders will be stored upright, chained to a supporting structure, and protected from vehicular effect and other effects by bollards constructed of steel pipe filled with concrete and set in concrete or concrete equivalent.

The potential fire or explosion risks for hydrogen storage and use on the SunCatchers are not significant. Hydrogen gas will only be used outdoors in well-ventilated open areas, which will allow the gas to dissipate to the atmosphere, thus mitigating the potential fire and explosion risk.

The risk of a fire and/or explosion from hydrogen will be minimized through adherence to applicable codes and design features, and the continued implementation of effective safety management practices. Appendix K, Hydrogen System Design Criteria, summarizes the applicable codes, standards, standard design criteria, and practices that form the basis of the design for the Project hydrogen system. Project hydrogen usage and storage requirements are listed below.

- Only experienced and properly instructed personnel will handle compressed gases. During filling, the cylinders will be secured in an upright position. The valve protection cap will be removed only just before connecting the cylinder to the manifold. The cylinder units will be electrically bonded to the system before discharging hydrogen. Personnel will ensure all connections will remain gas-tight during filling.
- Cylinders will be stored in compliance with the requirements of Compressed Gas Association pamphlet P-1, Safe Handling of Compressed Gases in Containers.

- The stored cylinders will be legibly marked with the name "Hydrogen" and proper identification labels. The identification labels applied by the gas supplier will be the primary identifier; not the color of the container.
- The storage areas will be prominently posted with the hazard class and gas identified. Signs stating "No Smoking" and "No Open Flames" will be posted.
- The storage area will be designed to accommodate the cylinder containers with adequate spacing and segregation by partitioning. Empty and full containers will be stored separately. The area will be above grade, well-drained, well-ventilated, and will have adequate separation from combustibles. The storage area will consist of a paved asphalt or concrete surface that has been graded to prevent accumulation of water. The cylinders will not be subject to prolonged exposure to damp environments. Structures used for shielding and shading will be fire-resistive. The cylinders will be stored in a fenced area to protect against tampering and damage. The cylinders will not be stored near readily ignitable substances or exposed to corrosive chemicals or fumes. The cylinders will be protected from objects that can produce harmful cuts or abrasions in the surface of the metal. The cylinders will not be stored in a location where heavy moving objects can strike or fall on them. The cylinders will be kept at pressures and temperatures not to exceed normal operating parameters. The ambient temperatures in the storage areas will not exceed 125 degrees Fahrenheit.
- The cylinders will be stored in a secured position to prevent falling or rolling. The cylinders will be nested to maintain a three-point contact grounding system or a grounding wire will be connected and used in all storage cylinders. Valve protection caps will be used and hand tightened.
- The cylinders will be stored in a secure area with access limited to authorized personnel only. Product inventory will be maintained. All inventory discrepancies will be investigated. All incidents involving thefts, misuse, or inventory shortages will be reported to law enforcement and to the supplier.

Other Gases

Other gases to be stored and used at the Project Site may include shop welding gases for maintenance activities. Typical welding gases are oxygen and acetylene. The potential effects presented by the use of these gases at the Project Site do not appear to be significant based on the data presented below.

- A limited quantity of each gas will be stored at the Project Site: a maximum of 6 to 10 bottles at the Main Services Complex and Satellite Services Complex.
- The gases will be stored in U.S. Department of Transportation approved safety cylinders secured to prevent upset and physical damage.
- Incompatible gases (e.g., flammable gases and oxidizers) will be stored separately.
- The gases will be stored in multiple standard-sized portable cylinders (in contrast to larger cylinders), generally limiting the quantity of gas released from an individual cylinder failure to less than 200 cubic feet.

Gasoline and Diesel Fuel

Gasoline is a Type 1B flammable liquid and is considered a severe fire hazard. Gasoline vapor is heavier than air. Vapor or gases may be ignited by distant ignition sources and flash back. To mitigate the fire and explosion risks, the gasoline storage tank shall have emergency relief venting in the form of construction of a device or devices that will relieve excessive internal pressure caused by an exposure fire.

The gasoline and diesel fuels will be stored in 5,000-gallon tanks in the refueling area. Gasoline and diesel fuel tanks will be located away from electrical lines and other potential ignition sources. The fuel tanks will be provided with dikes and/or firewalls capable of containing the volume of the largest tank. These tanks will be installed in a way that the exterior surface, including the bottom of the tank and connection piping, can be directly monitored and directly viewed.

The storage tanks for gasoline and diesel fuel will be protected from vehicular effect and other effects by bollards constructed of steel pipe filled with concrete and set in concrete or equivalent.

Transformer oil will not be stored on-site except in the transformers. Nearly the only risk of a transformer oil fire would be the unlikely event of a catastrophic transformer failure. This would require an emergency response from the SBCFD.

Acutely Hazardous Materials

The chemicals proposed for use at the Project Site are not Regulated Substances subject to the requirements of the California Accidental Release Prevention (CalARP) Program and process safety management, with the exception of hydrogen, which will be stored in each SunCatcher and in a hydrogen storage area.

In September 1996, Senate Bill 1889 was enacted to change the California Health and Safety Code (CHSC) Section 25531 *et seq*., replacing the Risk Management and Prevention Program requirements with the Risk Management Plan (RMP) requirements established pursuant to Section 112(r) of the federal Clean Air Act (42 United States Code Section 7412). Pursuant to Senate Bill 1889, the California Office of Emergency Services is required to adopt implementing regulations, initially as emergency regulations, and to seek and maintain delegation of the federal program. The CalARP Program merges federal and state programs for the prevention of accidental releases of toxic and flammable substances. The goal was to eliminate the need for two separate and distinct chemical risk management programs. The CalARP Phase I Final Regulations were approved on 16 November 1998.

The CalARP Program final regulations (Title 19 California Code of Regulations [CCR] Division 12, Chapter 4.5) provide two sets of lists of regulated substances: one for Federal Regulated Substances and one for State Regulated Substances.

- **Section 2770.5:** Tables 1 and 2 of Section 2770.5 list Federal Regulated Substances and threshold quantities for accidental release prevention, including flammable substances. Hydrogen is on the list.
- **Section 2770.5:** Table 3 of Section 2770.5 lists State Regulated Substances and threshold quantities for accidental release prevention. Hydrogen is on the list.

Based on the above regulations and the future use of hydrogen, an RMP is required and will be submitted to the SBCFD, CUPA.

An Off-site Consequences Analysis (OCA) for accidental release of hydrogen has been conducted in accordance with CEC regulations. The analysis is included in Section 5.15.2.3, Off-site Consequence Analysis.

Other Hazardous Materials

No adverse environmental effects related to other hazardous materials used at the Project Site are anticipated. Only small quantities of hazardous materials will be present during operation of the Project.

Solar One will maintain and implement an HMBP. Solar One will also implement best management practices consistent with the hazardous materials handling, emergency spill response, and reporting as specified in the HMBP. If a spill or release of hazardous materials should occur during operations, the spill area will be bermed or controlled as quickly as practical to minimize the footprint of the spill. Contaminated soil materials produced during cleanup of a spill will be placed into drums for off-site disposal as a hazardous waste at a permitted hazardous waste, transfer, storage, and disposal facility. If a spill or leak into the environment involves hazardous materials equal to or greater than the specific reportable quantity, federal, state, and local reporting requirements will be adhered to. In particular, the SBCFD will be notified. The SBCFD will also be called in the event of a fire or injury. Long-term or cumulative effects will be avoided by cleaning up any accidental leaks or spills of these materials as soon as they occur.

Material Safety Data Sheets

Material Safety Data Sheets for the hazardous materials will be kept on-site as required by 29 Code of Federal Regulations (CFR) 1910 Occupational Safety and Health hazard communication rules and regulations.

5.15.2.3 Off-site Consequence Analysis

The Project will use hydrogen gas as the working fluid in the Stirling Cycle Engine within each SunCatcher unit. The SunCatcher is a solar power system that has been designed to automatically track the sun and focus solar heat onto a PCU. The process of solar energy conversion begins with the Solar Receiver absorbing the focused solar energy in a system of receiver tubes, which contain hydrogen gas. The hydrogen gas within the solar receiver tubes then absorb the heat and raise the pressure in the receiver to drive the pistons of the Stirling Cycle Engine producing grid quality electricity. The Stirling Cycle Engine is a closed-cycle, sealed system where hydrogen gas is cooled, compressed, and recycled back to the Solar Receiver after the solar energy absorption process has occurred.

Solar One will consist of 34,000 SunCatcher units on-site. Each of the Stirling Cycle Engines, within the SunCatcher units, will contain 14 cubic feet of hydrogen gas. Additionally, each SunCatcher unit will be equipped with a 196-cubic feet hydrogen gas cylinder (k-bottle) to replenish hydrogen gas lost within the gas circuit (i.e., hydrogen gas lost from intentional minute

release used to maintain working pressure). In addition to the hydrogen gas volume stored within each of the SunCatcher units, the Solar One facility will store 113 k-bottles (22,148-cubic feet total) in a storage room. The storage facility will be located within the chemical storage area of the Main Services Complex as shown in Figure 5.15.1, Worst-Case Scenario for Hydrogen Explosion. The total combined hydrogen storage on-site will be 7,162,148 cubic feet (equivalent to 37,243 pounds of hydrogen using a density of 0.0052 lbs/ft^3).

The use and storage of hydrogen is regulated by state and federal regulations. Even though all hydrogen gas will be stored separately in 196 cubic-feet (1.02 lbs) capacity cylinders (k-bottles), the total combined amount of hydrogen stored on-site (37,243 lbs) will exceed the 10,000 lbs threshold quantities regulated by the California Accidental Release Prevention Program (CalARP) (i.e., California Code of Regulations Title 19 Division 2 Chapter 4.5) and federal Chemical Accident Prevention Provisions (i.e., Code of Federal Regulations Title 40 Part 68). Due to this threshold exceedance, Solar One will be subject to comply with all Risk Management Plan (RMP) requirements presented by both state and federal regulations.

One of the requirements of the RMP, presented by both state and federal regulations, is to conduct an off-site consequence analysis (OCA) for the hydrogen gas being stored at the Solar One site. The purpose of the OCA is to estimate the total area that could potentially be affected from an accidental release of the hydrogen gas. By estimating the total area of impact from an accidental release it is then possible to make a determination on the consequences that may be caused from an accidental hydrogen release from the Solar One site.

OCA evaluation for the storage and use of the hydrogen at the Solar One site was performed for this report. The United States Environmental Protection Agency (EPA) Risk Management Program (RMP) Off-site Consequence Analysis (OCA) Guidance (April, 1999) document was used for estimating impact. Pertinent equations and tables found in the EPA RMP OCA Guidance document were applied to determine the extent of impact caused from a release of hydrogen from the site. The evaluation results for the OCA were verified through the use of the EPA approved RMP*Comp (Version 1.07) OCA modeling program, which is based on the same methodology.

Two hypothetical release scenarios were evaluated for the OCA conducted for Solar One: (1) the release of all hydrogen stored in a single SunCatcher unit (i.e., 210-cubic feet of hydrogen) and (2) the release and combustion of hydrogen in a single k-bottle within the chemical storage area, which would in turn affect all other k-bottles in storage, causing the release of the entire hydrogen storage (i.e., 22,148-cubic feet of hydrogen). Both scenarios examine potential worst case accidental release scenarios that may occur at Solar One. The first scenario presents conditions for a worst case accidental release as provided by state and federal RMP regulatory guidance. The interconnected k-bottle and Stirling Cycle Engine found within each SunCatcher is the largest vessel of hydrogen found at the site from which an accidental release could occur. The second scenario presents conditions for an alternative worst case scenario, which could also provide a significant area of impact. Although the likelihood of either accidental release occurring is minimal, the analysis of these events presents two separate versions of potential worst case scenarios for the Solar One site, which provide the most conservative results for how the surrounding area could be affected from a hydrogen release.

The OCAs considered the total release and explosion of hydrogen gas during each scenario. Due to the chemical property of hydrogen, the most significant effect from an accidental hydrogen release is considered to be the explosion of the hydrogen gas release. Therefore, the EPA Vapor Cloud Explosion method was applied for the OCA evaluation of both scenarios. An explanation of the vapor cloud explosion method is provided below.

VAPOR CLOUD EXPLOSION METHOD

For vapor cloud explosions, the total quantity of hydrogen is assumed to form a vapor cloud. The entire cloud is assumed to be within the flammability limits, and the cloud is assumed to explode. Ten percent of the flammable vapor in the cloud is assumed to participate in the explosion. The impact is measured as the distance to the 1 pound per square inch (psi) overpressure level. This is determined using the following equation.

$$X = 0.0081 (0.1\ W_f \frac{H_{Cf}}{H_{CTNT}})^{1/3}$$

Where:

X = distance to overpressure of 1 pound psi (miles)
W_f = weight of flammable substance (lbs)
H_{Cf} = heat of combustion of flammable substance (joules/kg)
H_{CTNT} = heat of combustion of trinitrotoluene (4.68 E+06 joules/kg)

Source: Environmental Protection Agency Risk Management Program Guidance for Offsite Consequence Analysis Guidance (April 1999)

Impact Determination

As previously mentioned the vapor cloud explosion method was applied to determine the extent of impact from the hydrogen gas releases. The method presents the effects of the blast as the most significant hazard from the hydrogen explosion. The following section explains the determination of the blast endpoint applied by the vapor cloud explosion method for the OCA evaluations.

Blast Evaluation Endpoint

The vapor cloud explosion method uses the hazard produced from an explosion blast to model the extent of impact for an OCA. Blast impacts are of concern wherever flammable materials and ignition sources are present, or where processes operate under high temperatures and pressures. Blast impacts are described in terms of overpressure. The endpoint selected by the EPA as a significance criterion is an overpressure of 1.0 psi. An overpressure of 1.0 psi may cause partial demolition of houses, which can result in serious injuries to people and shattering of glass windows, which may cause skin laceration from flying glass.

WORST-CASE RELEASE SCENARIOS

The following accident scenarios were considered in the analysis of off-site impacts. The selection of these worst case scenarios was based on EPA's RMP criteria.

- **Scenario 1:** The content of one SunCatcher unit, composed of a hydrogen k-bottle plus the contents of the Sterling Cycle Engine, (210 cubic feet) at the Solar One site leak into the atmosphere. The released hydrogen forms a vapor cloud and 10% of the flammable vapor in the cloud participates in the explosion. (Note: vapor cloud explosions generally are considered unlikely events.)

- **Scenario 2:** The content of one hydrogen k-bottle is released and causes a fire in the chemical storage area, which in turn causes all the 113 hydrogen k-bottles (22,148 cubic feet) to explode, leaking hydrogen into the atmosphere. The released hydrogen forms a vapor cloud and 10% of the flammable vapor in the cloud participates in the explosion. (Note: vapor cloud explosions generally are considered unlikely events.)

The following tables show the parameters and scenarios used in the analysis.

Table 5.15-3, Chemical Physical Parameters, and Table 5.15-4, Scenario Definitions, show the parameters and scenarios used in the analysis.

Table 5.15-3
Chemical Physical Parameters

Chemical	H_c (kjoules/kg)	Density (pound per cubic foot)	Reference
Hydrogen	119,950	0.0052	1, 2

Sources:

1. EPA Risk Management Plan Off-site Consequence Analysis Guidance Exhibit C-2, Appendix C, 1999; and
2. Hydrogen Material Safety Data Sheet, 2008.

Note:
H_c = Heat of Combustion

Table 5.15-4
Scenario Definitions

Scenario	Container	Event Type	Chemical	Cubic Feet	Pounds
1	hydrogen k-bottle	Vapor Cloud Explosion	Hydrogen	210	1.1
2	hydrogen k-bottle			22,148	115.2

Source: EPA, 1999a.

The off-site consequence results modeled using the aforementioned methods are summarized in Table 5.15-6. Results obtained from the use of the EPA approved RMP*COMP software as shown in Appendix L, Hazardous Materials Handling.

The off-site consequence results are summarized in Table 5.15-5, Blast Distance to Endpoint (overpressure of 1 psi) from Center of Upset.

Table 5.15-5
Blast Distance to Endpoint (overpressure of 1 psi) from Center of Upset

Scenario	Size (cubic feet)	Chemical	Weight (pounds)	Distance (miles)	Distance (feet)
1	210	Hydrogen	1.1	0.012	63
2	22,148	Hydrogen	115.2	0.054	285

Source: EPA, 1999a.
Note:
psi = pounds per square inch

Figure 5.15-1, Worst-Case Scenario for Hydrogen Explosion, illustrates the impact areas for each scenario examined.

Off-site consequence modeling, based on EPA Risk Management Plan guidance, was performed to determine the area of impact arising from a catastrophic release of hydrogen at the Solar One site. Two accident scenarios were considered in the off-site consequence analysis evaluation. It should be noted that the parameters used for modeling were on the conservative side, which serves the purpose of determining and planning for the worst-case scenario. The distances from the center of the upset to the endpoint for the two worst-case scenarios are presented in the following table:

Table 5.15-6
Off-site Consequence Analysis Result

Event	Scenario	Distance (miles)
Explosion	1	0.012
	2	0.054

Source: EPA, 1999a.

For Scenario 1, the modeling result identified the extent of the hydrogen release impact is within 0.012 mile radius around each SunCatcher. Therefore, as long as the SunCatcher area keeps a clearance of 0.012 mile (63 feet) with the property boundary, the hydrogen release impact will be controlled within the Project Site.

For Scenario 2, the impact distance is identified to be 0.054 mile (285 feet) from the hydrogen storage facility. Since the hydrogen storage facility is located at least 3000 feet away from the

Project Site boundary at any direction, therefore the impact will also be contained within the Project Site.

Based on the OCA conducted for the two hypothetical worst case scenarios, an accidental release of hydrogen from the Solar One site is not expected to reach any sensitive receptors. The impacts from both hypothetical scenarios were determined to remain on-site.

Due to the area of impact having no potential for affecting off-site sensitive receptors, the Project Site can be classified as an RMP Program Level 1 (based on RMP regulatory criteria). However, RMP regulations provide the Administering Agency (AA) the ultimate authority in defining the appropriate RMP Program level for the facility. Solar One will comply with all the requirements for its designated RMP Program level.

The effects associated with the use of hazardous materials during maintenance and operations will be less than significant as a result of the Applicant implementing the above procedures.

5.15.2.4 Abandonment/Closure

Premature closure or unexpected cessation of Project operations will be outlined in the Project Closure Plan, which will be developed as the Project moves through regulatory review. The plan will outline steps to secure hazardous and non-hazardous materials and wastes. Such steps will be consistent with Best Management Practices, the HMBP, the RMP, and according to applicable LORS. The plan will include monitoring of vessels and receptacles of hazardous material and wastes, safe cessation of processes using hazardous materials or hazardous wastes, and inspection of secondary containment structures.

Planned permanent closure effects will be incorporated into the Project Closure Plan and evaluated at the end of the Project's economic operation. The Project Closure Plan will document non-hazardous and hazardous waste management practices including the inventory, management, and disposal of hazardous materials and wastes and the permanent closure of permitted hazardous materials and waste storage units.

5.15.3 Cumulative Effects

Based on land uses in the surrounding area and the limited amount and type of hazardous materials to be used as part of the Project, no significant cumulative effects due to hazardous materials handling are expected from the Project. As discussed in detail in Section 5.18, Cumulative Impacts, other proposed projects in the vicinity, would be expected to employ similar hazardous materials management.

In particular, as Solar Three is developed adjacent to the Solar One site using the same technology, only relatively small amounts of hazardous materials will be on-site and these will be controlled using the procedures discussed above. The construction and operation of transmission line upgrades in the area is not expected to result in cumulative impacts.

5.15.4 Mitigation Measures

The CEC standard conditions provide appropriate mitigation and compliance conditions that ensure that the Project uses hazardous materials in a way that complies with all applicable LORS in a manner that ensures no significant environmental effects.

5.15.4.1 Construction Phase

During construction, the hazardous materials to be stored on-site will be limited to small quantities of paint, coatings, adhesives, and emergency refueling containers. These materials will be stored in a locked utility shed or in a secured, fenced area with secondary containment. It is anticipated that fuels, lubricants, and other various fluids needed for operation of construction equipment will be transported to the construction site on an as-needed basis by equipment service trucks. Personnel working on the Project during construction will be trained in handling hazardous material, and will be alerted to the dangers associated with these materials. An on-site safety officer will be designated to implement health and safety guidelines and contact emergency response personnel and the local hospital, if necessary.

Construction contractors for the Project will be required to develop standard operating procedures for servicing and fueling construction equipment. These procedures will, at a minimum, include the items listed below.

HAZMAT-1

The following measures will be implemented related to fueling and maintenance of vehicles and equipment.

- No smoking, open flames, or welding will be allowed in the fueling/services areas.
- Servicing and fueling of vehicles and equipment will occur only in designated areas.
- Fueling service and maintenance will be conducted only by authorized, trained personnel.
- Refueling will be conducted only with approved pumps, hoses, and nozzles.
- All disconnected hoses will be handled in a manner that prevents residual fuel and fluids from being released into the environment.
- Catch pans will be placed under equipment/hose connections to catch potential spills during fueling and servicing.
- Service trucks will be provided with fire extinguishers and spill containment equipment, such as absorbents, shovels, and containers.
- Service trucks will not remain on the job site after fueling and service are complete.

HAZMAT-2

Spills that occur during vehicle maintenance will be cleaned up immediately, and contaminated soil will be containerized and sent for subsequent evaluation and off-site disposal. A log of all spills and cleanup actions will be maintained.

HAZMAT-3

Emergency telephone numbers will be available on-site for the fire department, police, local hospitals, ambulance service(s), and environmental regulatory agencies.

HAZMAT-4

Containers used to store hazardous materials will be properly labeled and kept in good condition.

It is anticipated that these standard operating procedures will minimize the potential for incidents involving hazardous materials during construction.

5.15.4.2 Operation and Maintenance

A listing of anticipated hazardous materials to be used on-site during Project operation can be found in Table 5.15-2, Hazardous Materials Usage and Storage During Operations.

HAZMAT-5: Hazardous Materials Storage

Hazardous materials storage will typically consist of the storage of oil within equipment, aboveground fuel storage tanks, 55-gallon drums, or 5-gallon pails of lubricants and oils, and smaller containers of paints and solvents. These materials will be managed as described below to mitigate potential releases.

- Hazardous materials will be stored in accordance with applicable regulations and codes (i.e., the Uniform Fire Code).
- Trucks delivering hazardous materials will be parked adjacent to the usage area or storage area where the chemicals are to be stored to minimize potential unloading and transportation accidents.
- Incompatible materials will be stored separately from each other.
- Containerized hazardous materials will be stored in original containers appropriately designed for the individual characteristics of the contained material. Containers will be labeled with contents and identification of fire hazards as required by the National Fire Prevention Association, 704.
- Containers of flammable materials will be stored in inflammable storage cabinet(s) when not in use.
- Hazardous materials will be stored within secondary containment structures, typically constructed of sealed concrete. These structures will have capacity for the largest container plus an allowance for rainwater equivalent to a 24-hour, 50-year storm, if the area is outdoors. Alternatively, containerized hazardous materials may also be stored in commercially available hazardous materials storage sheds with built-in secondary containment.
- Bulk hazardous materials at the Project Site will consist primarily of gasoline, diesel fuel, and mineral oil. These materials will be stored in aboveground storage tanks or in equipment

with secondary containment of 110 percent of the tank volume plus an allowance for rainwater for a 24-hour, 25-year storm. Hazardous materials are described below to mitigate the potential for releases to the environment.

- Seismic loads for hazardous materials storage and containment areas will be determined by the static lateral force procedures for the Uniform Building Code, and site-specific design features will be incorporated into these storage facilities. These structures will be designed and constructed in accordance with applicable codes, regulations, and standards.
- Underground piping and piping runs outside of secondary containment structures will be constructed with single-wall (secondary containment) piping to minimize the potential for releases and enable the Project staff to detect leaks, should they occur.
- Empty containers, especially portable tanks and drums, will be emptied, drained, and returned to the supplier for reuse to the maximum extent possible or recycled off-site.
- Pollution prevention efforts such as replacement of hazardous materials with less hazardous materials, reduction of hazardous waste generation volumes, and recycling will be employed at the Project Site, as practical.

HAZMAT-6: Personnel Training and Equipment

Personnel working with hazardous materials will be trained in proper handling and emergency response to chemical spills or accidental releases. Designated personnel will also be trained as a Project hazardous materials response team.

Safety equipment will be provided for use as required during chemical containment and cleanup activities and equipment will include safety showers and eyewash stations. Service water hose connections will be provided near chemical usage and storage areas to allow flushing of chemical spills, if needed.

HAZMAT-7: Materials Safety Data Sheets (MSDS)

MSDSs for the hazardous materials will be kept on site as required by 29 Code of Federal Regulations (CFR) Section 1910 Occupational Safety & Health Administration (OSHA) Hazard Communication rules and regulations.

HAZMAT-8: Hazardous Materials Management – Plans and Procedures

Several programs will address hazardous materials storage locations, emergency response procedures, employee training requirements, hazard recognition fire safety, first aid/emergency medical procedures, hazardous materials release containment/control procedures, hazard communication training, personnel protective equipment training, and release reporting requirements. These programs will include the HMBP, the worker safety program, the fire response program, the health and safety program, and Project standard operating procedures. The HMBP will cover procedures on hazardous materials handling, use, and storage; emergency response; spill prevention and control; training; record keeping; and reporting.

As discussed previously, an RMP for hydrogen will also be prepared.

HAZMAT-9: Spill Response Procedures

The following describes the general spill response procedures for the Project. Personnel will be trained in spill response reporting and cleanup procedures. The Project will maintain on-site one or more spill response kits. These kits will contain absorbents appropriate for the hazardous materials kept on-site and each kit will be clearly designated for the type of spilled material for which it should be used. Typically, these kits contain a barrel, shovel, and absorbents. Also, a supply of gloves and protective clothing will be maintained for use during spill response events.

The on-site coordinator will assess the situation, contain the leak or spill, begin cleanup operations with on-site staff or off-site contractors, as needed, and collect information for reporting, if needed. The following information will be needed for reporting:

- type of chemical released,
- amount of release or spill (i.e., volume and description, liquid, vapor, etc.),
- direction of release and distance traveled (if the release is outside the secondary containment),
- cause of spill or release,
- potential hazard to off-site personnel and local water bodies, including groundwater, and
- actions undertaken to mitigate the spill or release.

The appropriate governmental authorities will be contacted if required by laws and regulations, or as deemed necessary by the On-site Coordinator.

In the case of a small spill involving 55 gallons or less of liquid hazardous materials, the spill will be retained by a secondary containment structure. This type of spill will be confined to as small a space as possible using absorbent pigs or pillows, and be cleaned up with properly trained employees using absorbents available on-site. Similarly, small spills outside of secondary containment structures could be cleaned up by trained employees with on-site spill kit equipment.

Larger spills will normally be contained within secondary containment and will be cleaned up by outside contractors using trained spill response personnel if on-site employees could not handle the spill using available on-site spill response equipment.

Waste generated from spill cleanup will be placed in closed, labeled containers, typically 55-gallon drums or roll-off containers. Labeling will include the name of the facility (Solar One), date of start of accumulation, name of the spilled material, and hazardous waste identification language from 22 CCR 66262.32, and the established U.S. Department of Transportation shipping name, as needed.

Collected waste would be properly disposed of off-site at an approved recycling, landfill, or other appropriate disposal facility. Off-site transportation of spill wastes will be contracted with a licensed, hazardous materials and/or waste transportation company as applicable.

5.15.5 Compliance with LORS

Construction and operation of the Project will be conducted in accordance with all applicable LORS pertaining to hazardous materials. Applicable laws and regulations address the use and storage of hazardous materials to protect the environment from contamination, and Project workers and the surrounding community from exposure to hazardous and acutely hazardous materials.

5.15.5.1 Federal

The Superfund Amendments and Reauthorization Act of 1968 Title III (Sections 302, 304, 311, and 313) and regulations pursuant to the Clean Air Act of 1990 (40 CFR 68) established a nationwide emergency planning and response program, and imposed reporting requirements for businesses that store, handle, or produce significant quantities of extremely hazardous materials. The Acts require the states to implement a comprehensive system to inform local agencies and the public when a significant quantity of such materials is stored or handled at a facility (see 40 CFR 68.115). The requirements of these acts are reflected in CHSC, Section 25531 *et seq*. The Project will comply with these requirements as discussed below in Section 5.15.5.2, State.

Title 49 CFR Parts 171–177 govern the transportation of hazardous materials, the types of materials defined as hazardous, and the marking of the transportation vehicles.

5.15.5.2 State

CHSC Section 25500 requires companies that handle hazardous materials in sufficient quantities to develop an HMBP. The HMBP includes basic information on the location, type, quantity, and health risks of hazardous materials handled, stored, used, or disposed of that could be accidentally released into the environment. It also includes a plan for training new personnel, and for annual training of all personnel in safety procedures to follow in the event of a release of hazardous materials. It also includes an emergency response plan and identifies the business representative able to assist emergency personnel in the event of a release.

An HMBP will be developed before construction and operation of the Project.

CHSC Section 25531 directs facility owners storing or handling acutely hazardous materials in reportable quantities to develop a RMP and submit it to appropriate local authorities, EPA, and the SBCFD CUPA for review and approval. The RMP includes: an evaluation of the potential effects associated with an accidental release, the likelihood of an accidental release occurring, the magnitude of potential human exposure, any pre-existing evaluations or studies of the material, the likelihood of the substance being handled in the manner indicated, and the accident history of the material. This recently developed program supersedes the California Risk Management and Prevention Plan and is known as the CalARP. Solar One is required to prepare an RMP for the storage of hydrogen before operation of the Project.

Title 8 CCR Section 5189 requires facility owners to develop and implement effective Safety Management Plans to ensure that large quantities of hazardous materials are handled safely. Although such requirements primarily provide for the protection of workers, they also indirectly improve public safety and are coordinated with the RMP process.

California Government Code, Section 65850.2, states that a city or county shall not issue a final certificate of occupancy unless verification is available that the applicant has met the applicable requirements of CHSC Section 25531 and the requirements, if any, for a permit from the air pollution control district.

The Uniform Building Code contains requirements regarding the storage and handling of hazardous materials. The Chief Building Official must inspect and verify compliance with these requirements before issuance of an occupancy permit.

5.15.5.3 Local

The designated CUPA for the Project Site is the SBCFD, which is responsible for (1) the implementation of the HMBP and emergency response plan, and (2) the storage of hazardous materials in underground storage tanks and cleanup of petroleum releases.

The SBCFD will be contacted in the event of a release of hazardous wastes or materials to the environment.

5.15.5.4 Industry Standards

The Uniform Fire Code contains provisions regarding the storage and handling of hazardous materials. These provisions are contained in Articles 79 and 80. Article 80 was extensively revised in the latest edition (1994). These articles contain requirements that are generally similar to those contained in the California Health and Safety Code, Section 25531, *et seq*. However, the Uniform Fire Code does contain unique requirements for secondary containment, monitoring, and treatment of toxic gases emitted through emergency venting. These unique requirements are generally restricted to extremely hazardous materials.

The applicable LORS related to hazardous materials handling are summarized in Table 5.15-7, Summary of LORS – Hazardous Materials Handling.

Table 5.15-7
Summary of LORS – Hazardous Materials Handling

LORS	Requirements	Conformance Section	Administering Agency	Agency Contact
Federal Jurisdiction				
U.S. DOT Regulations, 49 CFR 171–177	Governs the transportation of hazardous materials, including the marking of the transportation vehicles.	Section 5.15.5.1	DOT Federal Motor Carrier Safety Administration	California Division 916-930-2760
State Jurisdiction				
Health and Safety Code Section 25500 *et seq.* (Waters Bill)	Requires preparation of an HMBP if hazardous materials are handled or stored in excess of TQ.	Section 5.15.5.2	San Bernardino County Fire Department CUPA Office	909-386-8401
Health and Safety Code Section 25531, *et seq*. (La Follette Bill)	Requires registration of the Project with local authorities and preparation of an RMP if hazardous materials stored or handled in excess of TQ.	Section 5.15.5.2	San Bernardino County Fire Department CUPA Office	909-386-8401
Title 8 CCR Section 5189	Facility owners are required to implement safety management plans to ensure safe handling of hazardous materials.	Section 5.15.5.2	San Bernardino County Fire Department CUPA Office	909-386-8401
California Uniform Building Code	Requirements regarding the storage and handling of hazardous materials.	Section 5.15.5.2	San Bernardino County Department of Public Works	909-387-8149
California Government Code Section 65850.2	Restricts issuance of COD until the Applicant has submitted an RMP.	Section 5.15.5.2	San Bernardino County Fire Department CUPA Office	909-386-8401
Local Jurisdiction				
DTSC San Bernardino County CUPA	Requires new/modified businesses to complete a hazardous materials business before final plan/permit approval.	Section 5.15.5.3	San Bernardino County Fire Department CUPA Office	909-386-8401
Industry Standards Jurisdiction				
UFC (Articles 79 and 80)	Requirements for secondary containment, monitoring, etc., for extremely hazardous materials.	Section 5.15.5.4	San Bernardino County Fire Department CUPA Office	Doug Synder Deputy Fire Marshall 909-386-8401

Source: Cal/EPA, 2008; San Bernardino County Department of Public Works, 2008; San Bernardino County Fire Department, 2008

Notes:
CCR = California Code of Regulations
CFR = Code of Federal Regulations
CUPA = Certified Unified Program Agency
DOT = U.S. Department of Transportation
DTSC = Department of Toxic Substances Control

Table 5.15-7
Summary of LORS – Hazardous Materials Handling

LORS	Requirements	Conformance Section	Administering Agency	Agency Contact

HMBP = Hazardous Materials Business Plan
LORS = laws, ordinances, regulations, and standards
RMP = Risk Management Protection Plan
TQ = Threshold Quantity
U.S. = United States
UFC = Uniform Fire Code

5.15.5.5 Agencies and Agency Contacts

A number of federal and state agencies regulate hazardous materials, including the EPA at the federal level and the California/Environmental Protection Agency at the state level. However, local agencies are the primary enforcers of hazardous materials laws. For the Project Site, the local agency is the SBCFD, as indicated in Table 5.15-8, Agency Contact List for LORS.

Table 5.15-8
Agency Contact List for LORS

	Agency	Contact	Address	Telephone
1	San Bernardino County Fire Department CUPA Office	Doug Synder Deputy Fire Marshall	620 South "E" Street San Bernardino, CA 92415	909-386-8401
2	San Bernardino County Department of Public Works	Gia Kim Land Development	825 East Third Street San Bernardino, CA 92415	909-387-8149

Source: San Bernardino County Department of Public Works, 2008; San Bernardino County Fire Department, 2008.
Notes:
CUPA = Certified Unified Program Agency
DTSC = Department of Toxic Substances Control
LORS = laws, ordinances, regulations, and standards

5.15.5.6 Permits Required and Permitting Schedule

Solar One will develop an HMBP before undertaking construction activities. Solar One will also develop and implement an RMP before the operation of the Project. See Table 5.15-9, Applicable Permits, for a list of potential permit requirements.

Table 5.15-9
Applicable Permits

Responsible Agency	Permit/Approval	Schedule
Federal	No permits required	N/A
State	No permits required	N/A
San Bernardino County Fire Department	Hazardous Materials Business Plan	30 days before storage of hazardous materials on-site
San Bernardino County Fire Department	Risk Management Plan	Before delivery of hydrogen to the Project Site

Table 5.15-9
Applicable Permits

Responsible Agency	Permit/Approval	Schedule

Source: California Department of Toxic Substances Control, 2008.
Notes:
CUPA = Certified Unified Program Agency
DTSC = Department of Toxic Substances Control
N/A = not applicable

5.15.6 References

Cal/EPA (California Environmental Protection Agency) and SDRWQCB (San Diego Regional Water Quality Control Board). 2008. Information downloaded from: http://www.waterboards.ca.gov/sandiego/. March.

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County of San Bernardino Department of Public Works. 2008. Information downloaded from: http://www.sbcounty.gov/dpw/contactus/default.asp. October

County of San Bernardino Fire Department. 2008. Information downloaded from: http://www.sbcfire.org/hazmat/index.asp. October.

EPA (Environmental Protection Agency). 1999a. Risk Management Program Guidance for Off-site Consequence Analysis. EPA RMP OCA, Chapter 5. Hydrogen Explosion Endpoint. April.

_____. 1999b. Risk Management Program Off-site Consequence Analysis Guidance. EPA RMP OCA, Exhibit C-1. Heat of Combustion of Hydrogen.

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Lewis, Richard J., Sr. 1992. *Sax's Dangerous Properties of Industrial Materials. Eighth Edition.* Van Nostrand Reinhold. New York, New York.

MSDS (Material Safety Data Sheet) for Hydrogen. 2008. Downloaded at http://www.acialloys.com/msds/h.html

NIOSH (National Institute of Occupational Safety and Health). 1997. NIOSH Pocket Guide to Chemical Hazards. DHHS Publication No. 97-140. U.S. Government Printing Office. Washington, D.C.

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Adequacy Issue:	Adequate		Inadequate		**DATA ADEQUACY WORKSHEET**		Revision No.	0	Date	
Technical Area:	**Hazardous Materials Handling**				Project:	SES Solar One		Technical Staff:		
Project Manager:					Docket:			Technical Senior:		

SITING REGULATIONS	**INFORMATION**	**AFC SECTION NUMBER**	**ADEQUATE YES OR NO**	**INFORMATION REQUIRED TO MAKE AFC CONFORM WITH REGULATIONS**
Appendix B (e) (1)	A discussion of how Project closure will be accomplished in the event of premature or unexpected cessation of operations.	Section 5.15.2.4		
Appendix B (g) (1)	...provide a discussion of the existing site conditions, the expected direct, indirect and cumulative effects due to the construction, operation and maintenance of the Project, the measures proposed to mitigate adverse environmental effects of the Project, the effectiveness of the proposed measures, and any monitoring plans proposed to verify the effectiveness of the mitigation.	Section 5.15.1 Section 5.15.2 Section 5.15.3 Section 5.15.4		
Appendix B (g) (10) (A)	A list of all materials used or stored on-site which are hazardous or acutely hazardous, as defined in Title 22, California Code of Regulations, § 66261.20 *et seq*., and a discussion of the toxicity of each material.	Section 5.15.1 Table 5.15-1 Table 5.15-2		
Appendix B (g) (10) (B)	A map at a scale of 1:24,000 depicting the location of schools, hospitals, daycare facilities, emergency response facilities and long-term health care facilities, within the area potentially affected by any release of hazardous materials.	Figure 5.16-1* *Map at scale other than 1:24,000 due to very large Project Site size		
Appendix B (g) (10) (C)	A discussion of the storage and handling system for each hazardous material used or stored at the site.	Section 5.15.1 Section 5.15.2 Table 5.15-1 Table 5.15-2		

Adequacy Issue:	Adequate		Inadequate		**DATA ADEQUACY WORKSHEET**		Revision No.	0	Date	
Technical Area:	**Hazardous Materials Handling**				Project:	SES Solar One		Technical Staff:		
Project Manager:					Docket:			Technical Senior:		

SITING REGULATIONS	**INFORMATION**	**AFC SECTION NUMBER**	**ADEQUATE YES OR NO**	**INFORMATION REQUIRED TO MAKE AFC CONFORM WITH REGULATIONS**
Appendix B (g) (10) (D)	The protocol that will be used in modeling potential consequences of accidental releases that could result in off site effects. Identify the model(s) to be used, a description of all input assumptions, including meteorological conditions. The results of the modeling analysis can be submitted after the AFC is complete.	Section 5.15.2.3		
Appendix B (g) (10) (E)	A discussion of whether a risk management plan (Health and Safety Code § 25531 *et seq*.) will be required, and if so, the requirements that will likely be incorporated into the plan.	Section 5.15.2.2 Section 5.15.2.3		
Appendix B (g) (10) (F)	A discussion of measures proposed to reduce the risk of any release of hazardous materials.	Section 5.15.2 Section 5.15.4		
Appendix B (g) (10) (G)	A discussion of the fire and explosion risks associated with the Project.	Section 5.15.2		
Appendix B (i) (1) (A)	Tables that identify laws, regulations, ordinances, standards, adopted local, regional, state, and federal land use plans, leases, and permits applicable to the proposed Project, and a discussion of the applicability of, and conformance with each. The table or matrix shall explicitly reference pages in the application wherein conformance, with each law or standard during both construction and operation of the Project is discussed; and	Section 5.15.5 Table 5.15-7		

Adequacy Issue:	Adequate		Inadequate		**DATA ADEQUACY WORKSHEET**		Revision No.	0	Date	
Technical Area:	**Hazardous Materials Handling**				Project:	SES Solar One		Technical Staff:		
Project Manager:					Docket:			Technical Senior:		

SITING REGULATIONS	**INFORMATION**	**AFC SECTION NUMBER**	**ADEQUATE YES OR NO**	**INFORMATION REQUIRED TO MAKE AFC CONFORM WITH REGULATIONS**
Appendix B (i) (1) (B)	Tables that identify each agency with jurisdiction to issue applicable permits, leases, and approvals or to enforce identified laws, regulations, standards, and adopted local, regional, state and federal land use plans, and agencies which would have permit approval or enforcement authority, but for the exclusive authority of the commission to certify sites and related facilities.	Section 5.15.5.5 Table 5.15-7 Table 5.15-8		
Appendix B (i) (2)	The name, title, phone number, address (required), and email address (if known), of an official who was contacted within each agency, and also provide the name of the official who will serve as a contact person for Commission staff.	Table 5.15-8		
Appendix B (i) (3)	A schedule indicating when permits outside the authority of the commission will be obtained and the steps the applicant has taken or plans to take to obtain such permits.	Table 5.15-9		

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SOURCES:
Stantec Engineering (project site Oct. 2008);
TIGER (railroad 2000); ESRI (overview);
BLM (land owners 2006
USDA (NAIP aerial 2005).

WORST-CASE RELEASE SCENARIOS FOR HYDROGEN RELEASE SOLAR ONE PROJECT

URS

1000 0 1000 2000 3000 Feet
SCALE: 1" = 2000' (1:24,000)
SCALE CORRECT WHEN PRINTED AT 22X34

CREATED BY: LG	DATE: 11-10-08	FIG. NO: 5.15-1
PM: WM	PROJ. NO: 27658185.10000	